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Gilbreth, Frank Bunker

The one best way to do work

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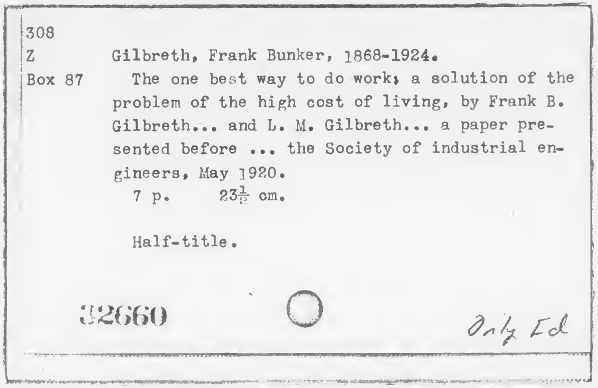

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The One Best Way to do Work

A SOLUTION OF THE PROBLEM OF THE HIGH COST OF LIVING

BY

FRANK B. GILBRETH, MEM. A.S.M.E., MEM. S.I.E.

AND

L. M. GILBRETH, PH. D.

A paper presented before several Chapters of the Society of Industrial Engineers

May, 1920

THE ONE BEST WAY TO DO WORK

A SOLUTION OF THE PROBLEM OF THE HIGH COST OF LIVING

Finding and using the One Best Way to Do Work results not only in educating the worker generally and specifically in his special life work, but also in increasing production, and thus reducing the high cost of living. We shall prove this in this paper, through definite examples and personal experiences, selected from our work of installing management and labor saving methods in the industries.

The One Best Way to Do Work is derived through Motion Study. It is taught by Motion Study. Motion Study automatically suggests invention of better methods. The use of the One Best Way to Do Work is made possible, and its maintenance assured, through Scientific Management, of which Motion Study is a part.

These statements are based on sound theory. They are also the result of successful practise, as it proved by many concrete examples, such as the following.

We have recently enabled one of our clients to reduce the time for certain operations together with assembling large carbureters, from four hundred and fifty minutes to forty-five minutes, thus doing the work in one-tenth of the previous time.

On small carbureters, we reduced the time from four hundred and twenty minutes to sixty minutes, reducing the time to one-seventh.

On certain operations and assembling of pumps, we reduced the time from three hundred and sixty minutes to thirty minutes, or to one-twelfth of the time.

In a large and well equipped Motion Study Laboratory, our demonstrators averaged victories of five to one, that is, we enabled the employees of our client to do the various operations in, on an average, one-fifth the previous time required.

In textile work, we have enabled the workers to produce sixty per cent more output, and, after changing machines, as a result of Motion Study, to produce from forty per cent to three hundred per cent more work, with less fatigue. In another instance, we increased output one hundred and nine per cent.

In three large factories we have cut the cost of interdepartmental transportation in halves.

In three large factories we have saved our entire fee by improving methods of handling product during the process of manufacture by the installation of the packet system, and the nesting tote-box method of handling material.

In two large organizations we have saved our fee through the salvage department alone.

In five large organizations we have saved our fee as a result of changes made from visualizing facts presented graphically. Again, in one organization, by a recommendation in a preliminary report, we have saved the client not only the entire cost of the preliminary report, but also of two subsequent fees for advice on installing the methods recommended in the preliminary report.

One of our clients estimated that the savings from the Suggestion System alone were over one hundred ~~million~~ thousand dollars per year.

Over ninety per cent of our work has resulted in repeat orders, because of the actual savings that result from our methods of measuring and presenting facts. Many more similar examples can be cited, in fact we have already cited many in various books and papers.*

These savings have all increased production, directly or indirectly. They have all resulted from attacking the problem from the Motion Study standpoint, with the aim of conserving and fostering the human element, and at the same time turning out that increased product which will reduce the cost of living. It is not strange that savings like these invariably occur, because they are the result of applying measurement. They come from the use of methods that have been scrutinized by executives and functional foremen, each of whom has come to the top because of his natural ability and keen study of the work in which he is a superspecialist. We wish to lay great stress on this. The reason that our method succeeds is because we utilize the art as well as the science of acquiring and teaching those methods which are selected by actual measurement.

How do we do this? By securing the co-operation of the workers and the executives, and by creating a demand as well as a market for their craft skill and craft knowledge.

Even where "Scientific Management" is worthy of its name, and its methods are based on data scientifically acquired, the worker may feel that there is a gulf between him and the "Planners." He must be made to feel that the opportunities in the planning function are open to everyone, and that planning is separated from performing while the work is actually being done only because this means the increased production that is essential for all, and for the workers even more than for the management. With the plan advocated here, there is a place for the man who possesses superskill in even the smallest details to use his knowledge; to sell it for money, and, ultimately, to work in accordance with his superskill and to earn regular wages in accordance with it. We "separate the planning from the performing," in accordance with the accepted best practice, but we do not segregate the function of determining the One Best Way, in the planning department. We encourage the workers who desire opportunities to do planning, and we furnish them with opportunities and means with which to do it. We provide channels for this natural and profitable desire to satisfy itself.

We have specially arranged inexpensive devices for this purpose which we have found efficient. For example: Furnishing the worker with film or paper photographs showing the best method extant. Loaning him a box of stereoscopic diapositives and a collection of small paper stereoscopic prints, and a miniature projecting lantern, so that he can utilize the co-operation and suggestions of his family, chums and associates to help him to do his work better. Providing a real Suggestion System, operated by standing orders, and specially handled to provide proper and sufficient motivation to induce the worker to sell his special knowledge for the suggestion reward. This system is handled in accordance with business principles, and operated in accordance with the laws of psychology. These and many other methods of stimulating planning and guided, constructive invention are a part of the art of increasing production through co-operation.

Even where work is of a secret nature,—as is less and less the case in progressive industry,—the worker can assist and actually participate, because he learns the method of attack for obtaining the One Best Way through Motion Study, and can apply it to other work, that is much different from that on which he learned it.

He is encouraged in self-expression. He is provided with the means and routine for self-expression. He is habituated to self-expression. Also, as he has learned to give out, he has also learned to take in information, to understand how to acquire, as well as to transfer, skill. To accept, as well as to give knowledge of the crafts, arts and trades. To welcome, as well as to suggest, changes and improvements.

All this is the result of Motion Study, or the study of the human side of the problem; of a realization of the direct effect on production of knowing the theory of work, and of maintaining interest. It must not be forgotten that there are forty million workers who can be affected by this increased interest. Or, more important still, that it concerns all types of training and experience.

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*See "Motion Study," "Primer of Scientific Management," "Applied Motion Study," "Fatigue Study," "Motion Study for the Handicapped," etc.

There is a general impression that "art" in improving management applies only to the handling of the skilled or highly educated workers. As a matter of fact, it applies to all relationships of the management. The laws that underlie success in producing output are based on a knowledge of universal instincts and other variables of Motion Study. Not to use them, argues one ignorant, careless, or worse.

Here lies the remedy for the "numbing monotony of highly repetitive work at which one is not skilled." There is no monotony where one has sufficient skill, and knows enough about the underlying principles and theories of the work to be interested in it, and has a standardized method to excel and a stint to exceed. There is, instead, actual joy, where the worker has a chance to show the "college man" and the recognized leaders and experts that he himself has the craft skill and craft knowledge to excel the best that the planning department has been able to do or to plan. Here we have, at the same time, provision for incentive and reward,—the creation and the satisfaction of a desire.

To understand this we must understand the procedure of deriving and recording the One Best Way, toward which the worker is contributing that portion of which he has more knowledge than anyone else.

With the old method of getting data by stop-watch time study, educative as it was to the man using the stop-watch, many of the timed, so called "elementary operations" are from fifteen hundredths of a minute to half a minute duration. Some are even much longer.

When it is realized that the average motion takes but from two thousandths to eight thousandths of a minute, it can be seen how impossible it is for the stop-watch to make accurate records; to identify which of the hundreds of thousands of possible practicable combinations should be selected; and to make definite the subject matter of the method, either from the standpoint of the One Best Way, or from the standpoint of the method which is mutually agreed upon as the basis of the piece rate, "which shall not be cut until the method is changed," to a method that is correspondingly quicker to do. Neither the average worker nor the average manager has a complete idea that this indefiniteness and inadequacy of data is the cause of the instability.

Such instability does not occur when the pay rate is based on quantitative and qualitative data that are accurate as to actual method, actual time, direction and sequence of motions, and as to easily visualized surroundings, conditions and tools on a method consisting of a standard sequence of the standard elements of a standardized behavior,—and on an over-all time based on the addition of the individual times of actually performed fundamental norms.

Again, only when the method is identified in the greatest detail,—as it is and as it can only be by the Micromotion Method of recording data,—can the worker be offered the fullest opportunity to make suggestions that arise from expertness in a narrow field. Super-skill is habitual behavior, covering periods, in many cases, less than one-sixty thousandths of a minute. The peculiarity of the motion that achieves the skill is too small for the human eye to record, the speed at which the motion is performed is too great for the human eye to follow. It is impossible for the human eye, without the micromotion process, to identify the indications of skill which compose the best way extant, to say nothing of selecting the elementary units of greatest efficiency for synthesizing the One Best Way which is to be standardized, taught, maintained, and attacked for still further improvement, through the Suggestion System.

Superskill may lie in the motions of workers who are apparently very lazy. Their loafing is not during the period of actual performance of the motions that make their skill, but during the low priced motions that require no skill. Even where skill is successfully located, it may not be captured, because even the most skilled are unable to duplicate their skilled performance at the slower pace of demonstration speed. The automaticity of habit is lost when the speed is lowered, and the result is very different from that in actual practice. Only when, through the micromotion method, the skilled performance is recorded at the habitual speed

can the motion be analyzed. The film, taken at a high rate of speed, can be projected slowly, or can be minutely scrutinized as consecutive lantern slides, and the behavior examined at leisure at any time, at any place. These separate "frames," or photographs,—each of which shows location, distance, relative time, exact time, relative speed, exact speed, direction, and evidences of consecutive mental processes, as evidencd by behavior,—transfer skill from those who have it to those who are to learn it. The visits to observe the superskilled worker in the distant factory are superseded by bringing the distant superskilled worker to demonstrate to the learner.

The methods of recording both the motions and the mental processes that accompany them are now available. Through the use of these methods only is it possible to get records that enable one to find the One Best Way, to teach it to the worker, to arouse and utilize his co-operation, and to increase production and thus reduce the cost of living.

To obtain the astonishing benefits in high wages to the worker and low unit costs to the employer that are possible as the result of the One Best Way to Do Work, it is necessary to know also the laws, practice and devices of management. We must not fail to emphasize the importance of Scientific Management for the purpose of maintenance. The One Best Way having been determined, the outcome is dependent upon maintaining the conditions that make it possible for the worker to perform repetitively his alloted work in the standard method, of the prescribed quality, in the planned time.

It is because the methods of dividing and recording decisions and motions have been standardized, that we can get accurate data. It is because the sixteen subdivisions of a cycle of motions are known, and the hundreds of psychological variables of motion study are recognized that we can actually find and set down elementary work units. Thus, since units for measuring, methods of measuring and devices for measuring are available, methods worthy to be permanently standardized can actually be used. Also, all methods of using all known forms of motivation can be definitely and specifically applied, not only as temporary expedients, but as permanent incentives for making repetitive those elements of the mechanism of management that will enable the worker to perform his work in the One Best Way, which has been derived by a combination of scientific methods, and countless synthesized minute elements of the skill of those who have the craft superknowledge and craft superskill.

Is there need for all this effort for determining the One Best Way at this particular time? One has but to review the present economic condition of this country to answer this question. At the present time the country is staggering under the high cost of living. This is realized everywhere. Mr. Sidney Hillman, at a recent meeting of the Harvard Liberal Club, said that the great labor union that he represents recognizes the gravity of the situation, and believes that greater output must be made to meet the need. The proper division of the profit from this output is a question to be debated and decided, but there is no question that the increased output must be made at once, and that increased output will help the worker, the employer and the public. This is a great step forward, and indicates the changed attitude of the labor leader thinkers.

The members of the club that he addressed realized also the gravity of the situation, and felt that a new type of education must cause and maintain the increased production necessary.

We emphasized at that meeting, as we do here, the methods by which both the greater production and the managerial and leadership education could be obtained. We showed that the world's war debt is insignificant as compared with the results of even a few years' operation of the new knowledge of work. It is not too much to say that in this country alone more than a hundred million dollars a day is unnecessarily wasted because no real continuous intelligent attempt is made to synthesize fundamental standards into the One Best Way in all the arts, crafts and trades. There are those who will think these figures ridiculous. But note what has already been done, as indicated by the examples cited earlier in this paper! And remember that these results came from installations that were expected to pay, and that did pay, in immediate results.

It may be said that there is nothing new about standardizing methods, educating workers, or providing for co-operation by such means as the Suggestion System. It is true that the ideas of standardization, education and co-operation are not new. But to secure these three through finding, analyzing, measuring, synthesizing, standardizing and teaching the One Best Way is new.

Standards derived through the old stop-watch method of time study are very crude and different from those derived from micromotion study. The former preserve only the time in which work has been done, and inaccurately, at that. The stop-watch method of time study does not identify the motions. The micromotion method preserves accurately the best that has been done and thought,—what has usually been forever lost with the death of each supercraftsman. Stop-watch records give only approximate times. Micromotion records give exact times, adequate records of motions, and a complete picture of the surroundings and conditions under which the work was done. The stop-watch method cannot possibly identify and preserve the One Best Way, and the cumulative best is so much more efficient than the usual "good enough" as to be astonishing. This cannot be appreciated by anyone who has not submitted the best of stop-watch data to micromotion study.

The micromotion records also furnish an ideal device for imparting information. The films are an encyclopedia to the worker, covering every detail of his trade. They enable him to study the measured methods of supermen. He does not have to start at the beginning, and acquire the interference of wrong habits due to learning the methods of mediocre craftsmen. On the contrary, he starts from the point of the cumulative best that has been known and thought in his work.

The knowledge of the sixteen therbligs, or fundamental motion study elements of a cycle of motions, that the micromotion method gives him, furnishes him with a method of attack on all problems of work. The fatigue study that always accompanies motion study teaches him to utilize his capacity to the utmost, yet conserve his strength and prolong his working years.

The Suggestion System as here advocated is unusual. It has nothing except its name to link it with many other suggestion systems now in operation, that serve only as a safety valve for discontent, and have little if any constructive value. It is based on the One Best Way to Do Work, and its details are so worked out as to make it self-maintaining, satisfying and permanent. We and our clients have had many of the elements of it in operation since 1897. It consists of approved elements only, that have stood the test of measurement and of the strain of years of actual use. It is operated in close connection with two other features already described, first, teaching every member of the organization to think in terms of the sixteen subdivisions of a cycle of motions, and second, synthesizing the accepted elements of behavior. It includes a complete set of consecutive photographic records, coupled with a definite reward for improvement on a method.

While the old type of management never recognized the One Best Way to Do Work as being something entirely different from that method standardized for immediate use as that of the "task," and vaguely described on the instruction card,—the newer management,—which lies at the base of the Suggestion System,—encourages adding, cumulatively, slightly better elements to a process forming the One Best Way Known, until enough have been added to warrant changing the instruction card of that method.

Suggesting big improvements to a method derived by men carefully selected and specially trained in the planning department is a difficult job for the average man in the plant. Adding small improvements offers countless opportunities to all. The Suggestion System is a channel by which these improvements are added. If it is properly operated, it does away with the former undesirable class distinction between the planning department and the performing department. It eliminates the criticism sometimes heard that "only those in the planning department are allowed to think." It gives everyone the opportunity to co-operate with the selected men of the planning department, and furnishes a means of training for positions in this department, if a taste for such work is developed.

It does not preclude or prevent a worker from studying, thinking, or inventing, simply because any one invention is not sufficiently profitable to warrant changing an old, or installing a new standard. Its use educates, and education leads to its use.

The main points of the method of its use we have described elsewhere, *and it is our intention to describe the entire process of the One Best Way to operate a Suggestion System in a later paper. It is only necessary here to emphasize that the psychology of its plan and its operation in actual practise must also be thoroughly understood, before its possibilities can be appreciated.

The direct product of a Suggestion System of the kind that we advocate, when operated in connection with the other features here described, has, as already stated, resulted in a net saving of over a hundred thousand dollars a year by one of our clients. But the direct products are by no means all of the benefits.

One great by-product of its records is that they serve as an indicator of trends. Under many old systems of management, suggestions are required to be submitted to the foreman, to be passed on or not, as he chooses. Under the new plan, the records of the System are an index of the popularity and efficiency of the foremen and of the other executives, and of the willingness of the workers under them to co-operate with them. The charts of the data of the Suggestion System are barometers of the state of co-operation and satisfaction existing.

Co-operation has too long been considered as something intangible, whose causes could not be traced, and whose results could not be estimated. As a matter of fact, both the causes and the results can not only be known, but also measured with considerable accuracy.

What are apparently new conditions, new complications, new problems, arise from day to day. One day the emphasis is on waste elimination. Next, perhaps, it is on fatigue elimination. Then on the necessity for "Safety First." Then on the need to utilize the crippled and blinded, soldier and civilian. Then on the demand for increased production. To-day on the necessity for stabilizing industry, and bettering industrial relations.

The vocabulary and phraseology change, the real problem remains the same. It is to utilize all available energy for the good of the community. It is for this that we eliminate waste, human and material; for this that we adjust, improve, combine.

The solution that Scientific Management offers is simply a method of applying measurement to the problem, and to the offered solutions. All parts of such management are needed for a successful outcome. We have emphasized standardization. As a result of our micromotion studies, we now emphasize super-standardization, education in the method of the super-efficient worker, and co-operation, as to be gained directly by applying Motion Study, and finding the One Best Way to Do Work.

While the method here shown offers a quick solution for the problem of obtaining greater production that can be utilized without delay, we do not want to be understood as advocating it to the exclusion of all that is good in the old forms of good management. We desire to emphasize the fact that there is more need than ever before for good management.

Neither should the recommendations for immediate increase in production be construed as undervaluing the other parts of Scientific Management, which have already been standardized, and which are the mechanism that maintain conditions which make repetitive and continuous the greatest production possible.

In this day of critical, even dangerous, instability, it is necessary that the adjustment that the science of management can bring, be installed with all the best of the art of which management is possessed. Science alone cannot do what is necessary. If we have not the art of presenting what we would do, we cannot succeed. If we have not the ethical vision to know what should be done, and why, and to find and hold the true philosophy of work, checked up by measurement of the actual practise, we do not deserve to succeed.

Therefore, because it is based on the laws of science; because it is presented in accordance with the laws of art; because it is in accord with the laws of ethics and conforms to a worth-while philosophy; and because, in practise, it has actually furnished the proof,—we present the One Best Way to Do Work as a solution of the problem of increasing production and lowering the high cost of living.

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*See "The Psychology of Management."

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